

## SECTION 601

### EARTHWORK FOR OPEN CHANNELS, DIKES, OR DAMS

#### 601.1 GENERAL

Earthwork specifications for channels, dikes, and dams shall consist of excavation, grading, side sloping, and compaction. Structural earthwork requirements are contained in Section 500.

#### 601.2 REFERENCES

ASTM D 1557

This publication:  
SECTION 201  
SECTION 204

#### 601.3 CLEARING AND GRUBBING

The area for clearing and grubbing shall be defined on the construction plans and this area shall be cleared and grubbed in compliance with Section 201.

#### 601.4 UNSUITABLE MATERIALS

601.4.1 Unsuitable materials include all material that contains debris, roots, organic matter, stones or boulders too large to be used in the intended construction, or other materials that are determined by the ENGINEER to be suitable. Otherwise suitable materials which are unsuitable due to excess moisture content will not be classified as unsuitable material unless it cannot be dried by manipulation, aeration or blending with other materials satisfactorily as determined by the ENGINEER.

601.4.2 On-site unsuitable materials will not be used for channel, dike, or dam construction. The CONTRACTOR shall remove and dispose of all unsuitable materials.

#### 601.5 ROCK EXCAVATION

601.5.1 Rock excavation shall consist of igneous, metamorphic and sedimentary rock, naturally in place, which cannot be excavated without blasting or the use of rippers, and all boulders or other detached stones having a volume of one (1) cubic yard or more, as determined by physical measurements or visually by the ENGINEER. Where any portion of the excavation contains strata classified as Rock Excavation and the various strata are parted with strips or strata not classified as Rock Excavation which constitute twenty-five (25) percent or less of the total thickness of the rock plus non-rock layers, the entire volume

of the combined layers shall be paid as Rock Excavation. Removal of surface boulders in excess of 1 cubic yard in volume shall be paid for under Clearing and Grubbing, unless specifically identified as Rock Excavation.

#### 601.6 CHANNELS

Open channels for the purpose of this section shall mean lined or unlined trapezoidal channels.

##### 601.6.1 EXCAVATION:

601.6.1.1 Excavation for channels shall be made to provide a uniform unlined channel surface for natural or earth channels or a surface suitable for placement of a specified lining material. Surfaces of the excavation shall be firm and unyielding and shall be such as will stand or can be made to stand without sloughing.

601.6.1.2 Excavation to provide a subgrade for lined channels or subdrainage material shall be to the lines indicated on the drawings; and excavation made below subgrade shall be backfilled and compacted to a density of not less than 90 percent, as determined by ASTM D 1557, or if approved by the ENGINEER with the concrete or other materials being placed. However, no payment will be made for such overexcavation or for the backfill thereof, regardless as to the approved material used for such backfill.

601.6.1.3 Where it becomes necessary to excavate beyond normal lines of excavation in order to remove boulders or other interfering objects, the voids remaining after the removal of such boulders or interfering objects shall be backfilled as follows:

601.6.1.4 When the void is below the subgrade for a lined channel, it shall be filled with suitable material, as approved by the ENGINEER, compacted to a density of not less than 90 percent, as determined by ASTM D 1557, or with the approval of the ENGINEER, concrete of the same mix as used in the concrete channel.

601.6.1.5 When the void is in the side of the excavation, suitable material, as approved by the ENGINEER, shall be placed in the manner and to the same relative density as the backfill in the vicinity of the void or, with the approval of the ENGINEER, concrete of the same mix as

used in a concrete lined channel. If concrete is placed prior to lining, a lower grade concrete may be used only if approved by the ENGINEER.

601.6.1.6 If during the progress of excavation material is encountered which, in the opinion of the ENGINEER, is unsuitable for subgrade for the structure to be constructed thereon, the ENGINEER may direct the CONTRACTOR to excavate beyond the pay lines shown on the drawings. However, suitability of subgrade shall be determined by the ENGINEER on the basis of its ability to withstand the load of the proposed channel and not upon the capacity to withstand the loads which may be placed thereon by the CONTRACTOR's equipment. Should the CONTRACTOR be directed to excavate beyond the pay lines shown on the drawings, said pay lines will be extended to include such ordered excavation and the pay lines for sub-drainage material, if used, will be adjusted accordingly.

601.6.1.7 Materials used for work performed by the CONTRACTOR to stabilize subgrade so it will withstand loads which may be placed thereon by his equipment shall be at the CONTRACTOR's expense.

#### 601.6.2 FILL AND COMPACTED BACKFILL:

601.6.2.1 Suitable material obtained from the project excavations will be used as fill or backfill provided all organic material, rubbish, debris, and other objectionable material contained therein are first removed. However, stone and broken Portland cement concrete pavement obtained from the project excavations will be permitted in the backfill or fill with the following limitations:

601.6.2.1.1 The maximum dimension of any piece used shall be 12 inches.

601.6.2.1.2 Pieces larger than 4 inches shall not be placed within 12 inches of any structure.

601.6.2.2 Unless otherwise specified on the plans, the density, placement, and compaction of fills and backfills shall be as specified in Section 204.

601.6.2.3 There shall be no extra payment made for moving and using excavated materials within the limits of the projects.

#### 601.6.3 GRADING

601.6.3.1 Grading of unlined channels and berms shall conform to the following tolerances:

601.6.3.1.1 A vertical tolerance of none above and 3 inches below the specified grade will be allowed on channel bottom, channel side slopes in both cut and fill, and berms and access road side slopes in cut.

601.6.3.1.2 A vertical tolerance of none below and 3 inches above the specified grade will be allowed on top surfaces of berms and access road in both cut and fill, and berm and access road side slopes in fill.

601.6.3.1.3 Regardless of the construction tolerances specified, excavation and grading shall be performed so that finished surfaces are in uniform planes with no abrupt breaks in the surface.

601.6.3.1.4 Construction tolerances specified hereinabove for grading are solely for purposes of field control.

601.6.3.2 Grading tolerances for channels which will be lined with concrete, riprap, or flexible matting shall be specified on the construction plans.

#### 601.7 DIKES AND DAMS

601.7.1 The construction plans shall specify the zones for key or core excavation, type of earth materials in each zone, maximum compaction required in each zone, and surface grading tolerances.

601.7.2 The CONTRACTOR will submit samples of the proposed fill materials for compliance with the specifications.

#### 601.8 MEASUREMENT AND PAYMENT

601.8.1 Earthwork for open channels shall be measured by the cubic yard in place at the time of excavation. Payment will be made at unit price per cubic yard for the particular operation, as specified in the Bid Proposal.

601.8.2 Clearing and grubbing may be included in the unit price of the excavation, or may be at a lump sum price, or may be at a unit price per cubic yard. Bid Proposal shall specify the unit of payment.

601.8.3 Compacted fill will be measured by the cubic yard of the material compacted in place. Payment will be made at the unit price per cubic yard per specified material as defined in the Bid Proposal.

601.8.4 Rock excavation will be paid by the cubic yard in place, prior to start of construction and measured to the

limits of excavation specified on plans.  
No compensation will be made to the  
CONTRACTOR for excess rock excavation due  
to overshooting, nor for the cost of  
backfilling voids or depressions  
resulting from overshooting.